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DERWENT-WEEK: 200273

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TITLE: Multiple computer printing unit has sensors to detect which output trays are in use and permits remote user to select output tray for next job

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ABSTRACTED-PUB-NO: EP 996038A

BASIC-ABSTRACT:

NOVELTY - The printing system has a **printer** (1), that may also be a photocopier, connected to one or more computers (8). When a computer requires to print, it makes a request to the **printer** which is granted if the **printer** is idle. The computer can then obtain data defining the status of each of a number of output trays. Each tray has a sensor (2-4) indicating the presence of paper. The computer presents this data to the user who can select an tray for the output of the next job.

USE **- Output tray selection in printer**

ADVANTAGE - Allows a remote user to determine which tray will collect the print job hence simplifying identifying which job belongs to a person

DESCRIPTION OF DRAWING(S) - Printing system

Printer 1

Output tray occupancy detectors 2-4

Computer advising user which trays are in use and allowing selection of tray 8

CHOSEN-DRAWING: Dwg.1/7

TITLE-TERMS: MULTIPLE COMPUTER PRINT UNIT SENSE DETECT OUTPUT TRAY PERMIT
REMOTE USER SELECT OUTPUT TRAY JOB

DERWENT-CLASS: P84 S06 T01 T04

EPI-CODES: S06-A14E; S06-A19A2; T01-C05A1; T04-G06A; T04-G10E;

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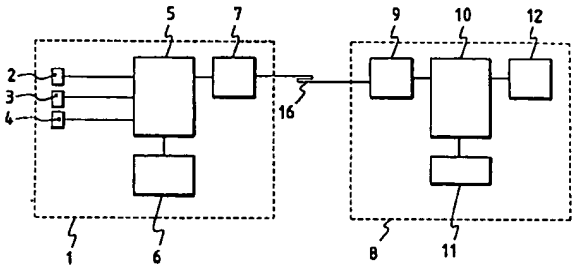
Remarks:
This application was filed on 05 - 07 - 2000 as a divisional application to the application mentioned under INID code 62.

## (54) Image forming system in which image processing apparatus is connected to image forming apparatus

(57) An image forming system, of the present invention, which has an image forming apparatus for forming an image on a paper sheet in accordance with image data output from a computer includes a plurality of storage units, provided to the image forming apparatus, for storing the paper sheet, a plurality of detecting units for detecting the paper sheet on each of the plurality of storage units, a display unit, provided to the computer for displaying a detection result from each of the plurality of detecting units, an input unit, provided to the computer, for inputting an instruction for selecting the storage unit, and a control unit, provided to the image forming apparatus, for selecting the storage unit in accordance with the instruction input from the input unit. With this arrangement, the operator of the computer can detect the sheet storage status of the storage unit while staying in front of the computer, thereby selecting a desired storage unit.

FIG. 1

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## Description

### BACKGROUND OF THE INVENTION

#### Field of the Invention

**[0001]** The present invention relates to an image forming system in which an image processing apparatus is connected to an image forming apparatus.

#### Related Background Art

**[0002]** Conventionally, an image formed by a personal computer or the like is printed out by a printer. However, such a printer has only one ejecting paper tray and cannot sort printed recording paper sheets. A printer has been proposed which is connected to a sorter so as to sort printed recording paper sheets. However, such a printer only controls the storage destination in the sorter from the printer side. An operator operating in front of a personal computer has no means for detecting a specific storage unit in the sorter, resulting in difficulty in finding recorded paper sheets destinated for the operator.

### SUMMARY OF THE INVENTION

**[0003]** It is an object of the present invention to provide an image forming system for solving the above problem.

**[0004]** It is another object of the present invention to provide an image forming system in which an operator can detect the status of each storage unit of an image forming apparatus from an image processing apparatus side, thereby selecting the storage unit.

**[0005]** It is still another object of the present invention to provide an image forming system in which an operator at an image processing apparatus can certify an automatically selected storage unit of an image forming apparatus.

**[0006]** It is still another object of the present invention to provide an image forming system in which the operator at an image processing apparatus can change an automatically selected storage unit of an image forming apparatus.

**[0007]** Other objects and features of the invention will be apparent from the following detailed description in conjunction with the accompanying drawings.

### BRIEF DESCRIPTION OF THE DRAWINGS

**[0008]**

Fig. 1 is a block diagram showing an image forming system of an embodiment of the present invention;
Fig. 2 is a view showing the outer appearance of the image forming system;
Fig. 3 is a view for explaining a communication operation of the image forming system;
Fig. 4 is a view for explaining a communication operation of the image forming system;
Fig. 5 is a view for explaining a communication operation of the image forming system;
Fig. 6 is a view for explaining a communication operation of the image forming system; and
Fig. 7 is a view for explaining a communication operation of the image forming system.

### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[First Embodiment]

**[0009]** Figs. 1 to 3 are views showing the first embodiment of the present invention. Referring to Figs. 1 and 2, an image forming apparatus 1 records image data from a computer 8. A sensor 2 detects the presence/absence of recording paper sheets on an ejecting paper tray 13. A sensor 3 detects the presence/absence of recording paper sheets on an ejecting paper tray 14. A sensor 4 detects the presence/absence of recording paper sheets on an ejecting paper tray 15. A control circuit 5 controls all operations in the image forming apparatus, including processing of signals from the sensors 3 to 4. An ejecting paper tray switching unit 6 switches the ejecting paper tray for receiving recording paper sheets in accordance with a signal from the control circuit. An interface (I/F) 7 on the image forming apparatus side connects the image forming apparatus 1 to the computer 8 through communication. The computer 8 generates or stores image data. An interface (I/F) 9 on the computer 8 side connects the image forming apparatus 1 to the computer 8 through communication. A CPU 10 controls the computer 8. A keyboard 11 is used by an operator to input an instruction to the computer 8. A CRT 12 serves as the display unit of the computer 8. The ejecting paper tray 13 serves as one of the storage units for storing recording paper sheets. The ejecting paper tray 14 serves as one of the storage units for storing recording paper sheets. The ejecting paper tray 15 serves as one of the storage units for storing recording paper sheets. A cable 16 connects the image forming apparatus 1 to the computer 8 for communication. Recording paper sheets 17 are selectively ejected onto the ejecting paper trays. The operation of the first embodiment is sequentially described in Fig. 3.

**[0010]** The operation in the above arrangement will be described below with reference to Fig. 3.

**[0011]** When an image generated or stored in the computer 8 is to be printed out, the operator inputs a print instruction from the keyboard 11 to the computer 8. Upon reception of this instruction, the CPU 10 of the computer 8 transmits a printer occupancy command to the image forming apparatus 1 through the I/F 9. Upon reception of the printer occupancy command through the I/F 7, the control circuit 5 of the image forming appa-



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ratus 1 certifies the occupancy status of the image forming apparatus itself. If a recording enable state is set, a command for permission of occupancy is transmitted to the computer 8 (at this time, if the image forming apparatus is connected to a plurality of computers, and recording of an image from one of the remaining computers is being performed, or if the image forming apparatus singly has a copy function, and a copying operation is being performed, a command for rejection of occupancy is sent. However, this status is not the subject matter, and a detailed description thereof will be omitted).

**[0012]** Upon reception of the command for permission of occupancy, the computer 8 sends a status request to grasp the status of the image forming apparatus 1. Upon reception of the status request, the image forming apparatus 1 sends a status containing information of the presence/absence of recording paper sheets on each ejecting paper tray. Upon reception of this status, the computer 8 indicates the status of each ejecting paper tray on the CRT 12, thereby prompting the operator to select an ejecting paper tray. In Fig. 2, the recording paper sheets are present on the ejecting paper tray 13. Therefore, the status indication of the ejecting paper tray 13 is the "presence of recording paper sheets", and the status indication of the ejecting paper trays 14 and 15 is the "absence of recording paper sheets". Upon checking the indication, the operator selects the ejecting paper tray 14 or 15 when the recording paper sheets are to be stored on an available ejecting paper tray, and inputs a designation of the ejecting paper tray from the keyboard 11 to the computer 8. In this case, assume that the ejecting paper tray 14 is selected. Upon reception of the designation of the ejecting paper tray, the computer 8 transmits a command for designation of the ejecting paper tray to the image forming apparatus 1 such that the recording paper sheets are output onto the ejecting paper tray 14. Upon reception of the command for designation of the ejecting paper tray, the control circuit 5 sends a signal to the ejecting paper tray switching unit 6. The ejecting paper tray switching unit 6 switches a convey path (not shown) to the ejecting paper tray such that the recording paper sheets are ejected onto the ejecting paper tray 14. The computer 8 transmits the image data to the image forming apparatus 1 during this time, though no problem is posed because a time required for switching of the convey path is sufficiently shorter than that required from reception of the image data to the end of print. Upon reception of the image data, the image forming apparatus executes print and stores the recording paper sheets on the designated ejecting paper tray 14.

[Second Embodiment]

**[0013]** Figs. 1, 2, and 4 are views showing the second embodiment. A description of Figs. 1 and 2 is the same as that in the first embodiment and will be omitted.

**[0014]** A description will be made with reference to Fig. 4. An operation before reception of a status signal by a computer 8 is the same as that in the first embodiment, and a detailed description thereof will be omitted. An operation after reception of the status by the computer 8 will be described. Upon reception of the status, the computer 8 automatically selects an available ejecting paper tray and transmits a command for designation of the ejecting paper tray to an image forming apparatus 1. Upon reception of the command for designation of the ejecting paper tray, a control circuit 5 in the image forming apparatus 1 sends a selection signal to an ejecting paper tray switching unit 6. The ejecting paper tray switching unit 6 switches a convey path to the ejecting paper tray such that recording paper sheets are ejected onto an ejecting paper tray 14. The computer 8 transmits image data to the image forming apparatus 1 during this time, and at the same time, indicates the ejecting paper tray number selected by the computer 8 on a CRT 12, thereby informing an operator of the ejecting paper tray for receiving the recording paper sheets. Upon reception of the image data, the image forming apparatus 1 executes print and ejects the recording paper sheets onto the ejecting paper tray 14.

[Third Embodiment]

**[0015]** Figs. 1, 2, and 5 are views showing the third embodiment. A description of Figs. 1 and 2 is the same as that in the first embodiment and will be omitted. In Fig. 5, an operation from reception of a status signal by a computer 8 to automatic selection of an available tray is the same as that in the second embodiment, and a detailed description thereof will be omitted. The subsequent operation will be described with reference to Fig. 5.

**[0016]** Upon selection of the ejecting paper tray, the computer 8 indicates the selection result and the status of each ejecting paper tray on a CRT 12, thereby requesting an operator for certification. Upon checking the indication, the operator inputs data representing acknowledgement or change of selection of the ejecting paper tray selected by the computer 8 from a keyboard 11. The computer 8 transmits a command for designation of the ejecting paper tray to an image forming apparatus 1 in accordance with the data input from the keyboard 11. Thereafter, the same operation as that in the first embodiment is performed to store recording paper sheets on an ejecting paper tray 14.

[Fourth Embodiment]

**[0017]** Figs. 1, 2, and 6 are views showing the fourth embodiment. A description of Figs. 1 and 2 is the same as that in the first embodiment and will be omitted. An operation before transmission of a command for permission of occupancy by an image forming apparatus 1 is the same as that in the first embodiment. The subse-



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quent operation will be described with reference to Fig. 6.

**[0018]** Upon transmission of the command for permission of occupancy, a control circuit 5 automatically selects an available ejecting paper tray and sends a selection signal to an ejecting paper tray switching unit 6. The ejecting paper tray switching unit 6 switches a convey path such that recording paper sheets are ejected onto the selected ejecting paper tray and transmits data representing the selection result to a computer 8. Upon reception of the data representing the selection result, the computer 8 indicates the selection result on a CRT 12 in accordance with the data to inform an operator of it, and sends image data to the image forming apparatus 1.

**[0019]** Thereafter, the same operation as that in the first embodiment is performed to store the recording paper sheets on an ejecting paper tray 14.

[Fifth Embodiment]

**[0020]** Figs. 1, 2, and 7 are views showing the fifth embodiment. A description of Figs. 1 and 2 is the same as that in the first embodiment and will be omitted. An operation before reception of data representing the selection result of an ejecting paper tray is the same as that in the fourth embodiment, and a detailed description thereof will be omitted. The subsequent operation will be described with reference to Fig. 7.

**[0021]** Upon reception of the data representing the selection result, a computer 8 indicates the selection result on a CRT 12, thereby requesting an operator for certification.

**[0022]** Thereafter, the same operation as that in the third embodiment is performed to store recording paper sheets on an ejecting paper tray 14.

**[0023]** In the above embodiments, the image forming apparatus has been described as a printer. However, it is not limited to a printer and may also be applied to a copying machine or the like having a facsimile communication function. In the above embodiments, a single computer and a single printer are used for the descriptive convenience. However, a plurality of computers and printers connected with each other in a LAN may also be used. The computer and the image forming apparatus may also be set at different locations.

**[0024]** As has been described above, available recording paper sheet storage units can be detected, and the information can be transmitted to a computer or the like to designate a storage unit from the computer or the like. With this arrangement, the conventional problem can be solved, thereby realizing an image forming system having excellent operability.

**[0025]** The present invention can be applied to selection of a sheet feeding unit in an image forming apparatus. More specifically, the presence/absence or size of sheets in a plurality of feeding units is detected. The detection result is indicated on the CRT of a computer. An operator is prompted to select a feeding unit, or the image forming apparatus or the computer automatically selects a feeding unit. The selected feeding unit and the detection result may be indicated on the CRT of the computer.

**[0026]** In addition, the feeding unit automatically selected by the image forming apparatus or the computer may be changed by operating the keyboard of the computer.

**[0027]** An image forming system, of the present invention, which has an image forming apparatus for forming an image on a paper sheet in accordance with image data output from a computer includes a plurality of storage units, provided to the image forming apparatus, for storing the paper sheet, a plurality of detecting units for detecting the paper sheet on each of the plurality of storage units, a display unit, provided to the computer for displaying a detection result from each of the plurality of detecting units, an input unit, provided to the computer, for inputting an instruction for selecting the storage unit, and a control unit, provided to the image forming apparatus, for selecting the storage unit in accordance with the instruction input from the input unit. With this arrangement, the operator of the computer can detect the sheet storage status of the storage unit while staying in front of the computer, thereby selecting a desired storage unit.

**[0028]** An image forming system, of the present invention, which has an image forming apparatus for forming an image on a paper sheet in accordance with image data output from a computer includes a plurality of storage units, provided to the image forming apparatus, for storing the paper sheet, a plurality of detecting units for detecting the paper sheet on each of the plurality of storage units, a display unit, provided to the computer for displaying a detection result from each of the plurality of detecting units, an input unit, provided to the computer, for inputting an instruction for selecting the storage unit, and a control unit, provided to the image forming apparatus, for selecting the storage unit in accordance with the instruction input from the input unit. With this arrangement, the operator of the computer can detect the sheet storage status of the storage unit while staying in front of the computer, thereby selecting a desired storage unit.

**Claims**

1. A control method for an image forming system having an image forming apparatus which has image forming means for forming an image on a paper sheet in accordance with image data output from an image processing apparatus and plural storage means for storing the paper sheets, the image forming apparatus generating status information, capable of being output to the image processing apparatus, including information representing a state of the storage means, said method compris-



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ing the steps of:

transmitting a command requiring the status information from the image processing apparatus to the image forming apparatus;
receiving the status information output from the image forming apparatus in accordance with the command from the image processing apparatus;
determining the storage means to be selected on the basis of the status information received in said receiving step, in the image processing apparatus;
displaying a determination result at the image processing apparatus; and
transmitting a command for selecting the storage means from the image processing apparatus to the image forming apparatus in accordance with the determination result.

2. A method according to claim 1, wherein each of the plural storage means stores the paper sheet on which an image is formed, and the status information includes the information concerning the presence/absence of the paper sheet on the storage means.

3. A method according to claim 1, wherein each of the plural storage means stores the paper sheet on which an image is not formed, and the status information includes the information concerning the presence/absence of the paper sheet on the storage means.

4. A method according to claim 1, wherein each of the plural storage means stores the paper sheet on which an image is not formed, and the status information includes information concerning a size of the paper sheet stored on the storage means.

5. A method according to claim 1, further comprising the step of inputting of an instruction for a change of the storage means determined in the image processing apparatus.

6. A control method for an image formation apparatus which has image forming means for forming an image on a paper sheet in accordance with image data output from any of plural image processing apparatuses and plural storage means for storing the paper sheets, comprising the steps of:

a first step of generating status information which includes information representing a state of the storage means and can be displayed by the image processing apparatus;
a second step of receiving a first command which is output from any of the plural image processing apparatuses and to request the status information;
a third step of transmitting the status information to the image processing apparatus which is in the plural image processing apparatuses and outputs the first command, in accordance with the reception of the first command in said second step;
a fourth step of receiving a second command which includes an instruction to select the storage means, from the image processing apparatus which received the status information transmitted in said third step; and
a fifth step of selecting the storage means in accordance with the reception of the second command in said fourth step.

7. A method according to claim 6, wherein each of the plural storage means stores the paper sheet on which an image is formed, and the status information includes the information concerning the presence/absence of the paper sheet on the storage means.

8. A method according to claim 6, wherein each of the plural storage means stores the paper sheet on which an image is not formed, and the status information includes the information concerning the presence/absence of the paper sheet on the storage means.

9. A method according to claim 6, wherein each of the plural storage means stores the paper sheet on which an image is not formed, and the status information includes information concerning a size of the paper sheet stored on the storage means.



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FIG. 1

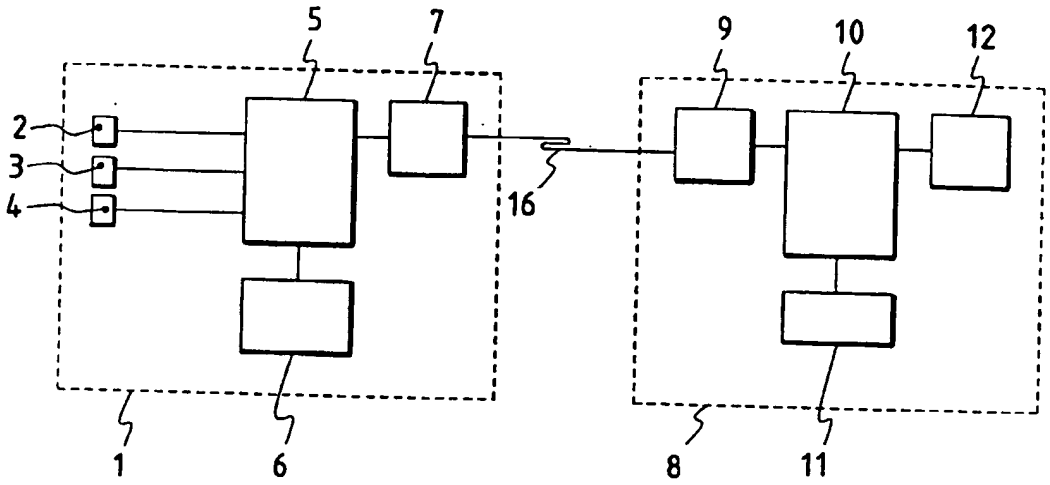



FIG. 2

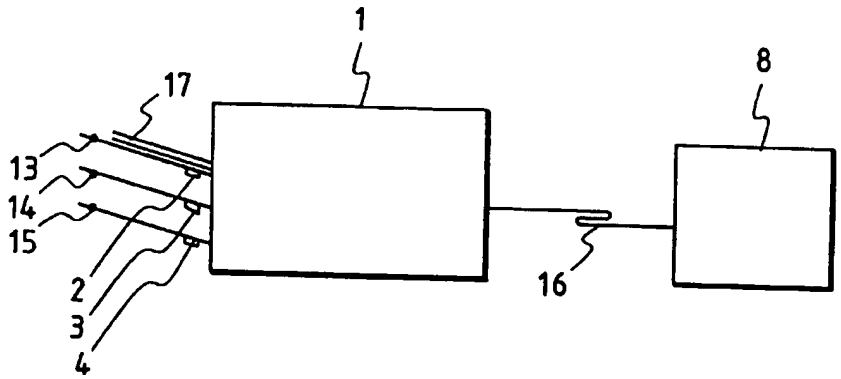
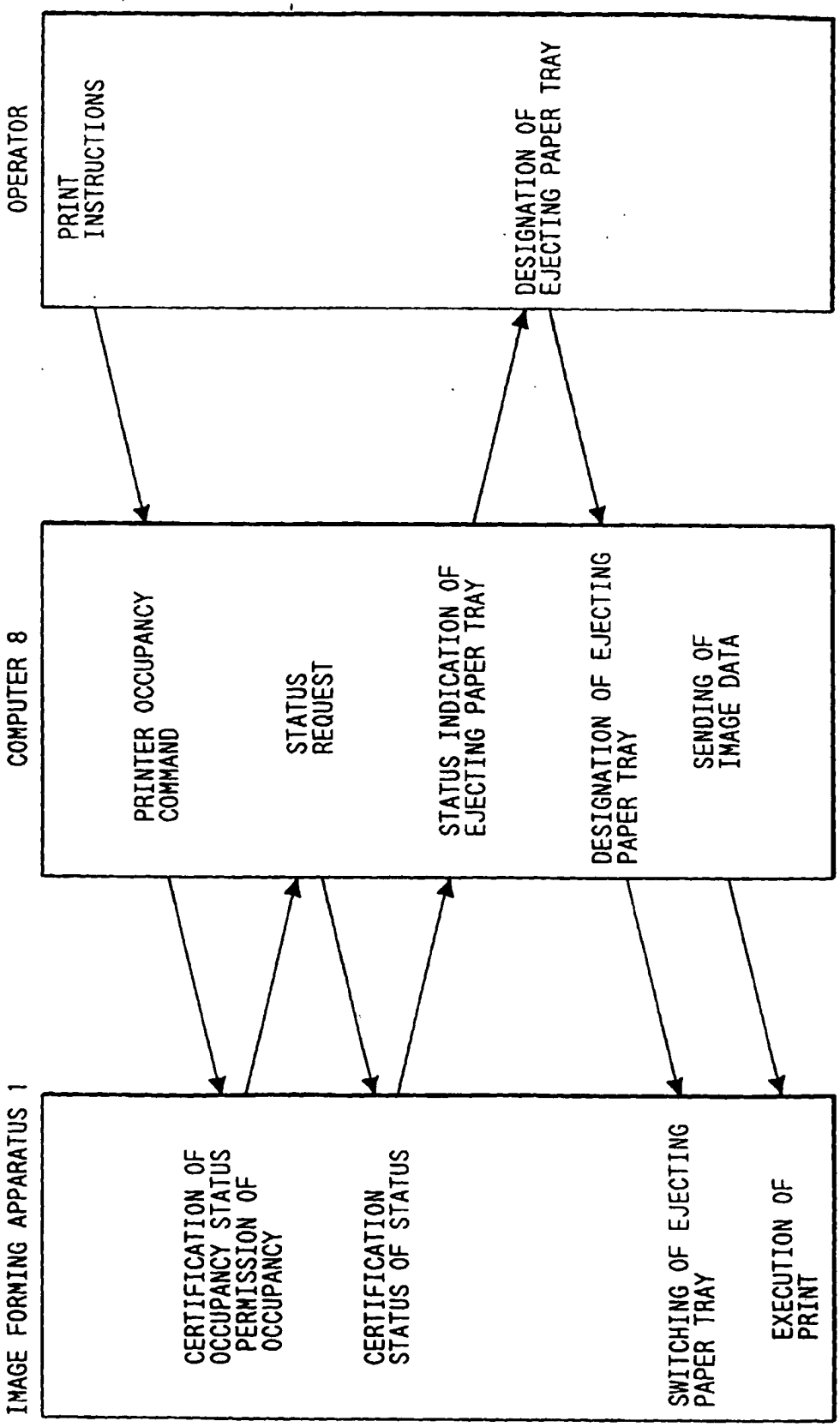


FIG. 3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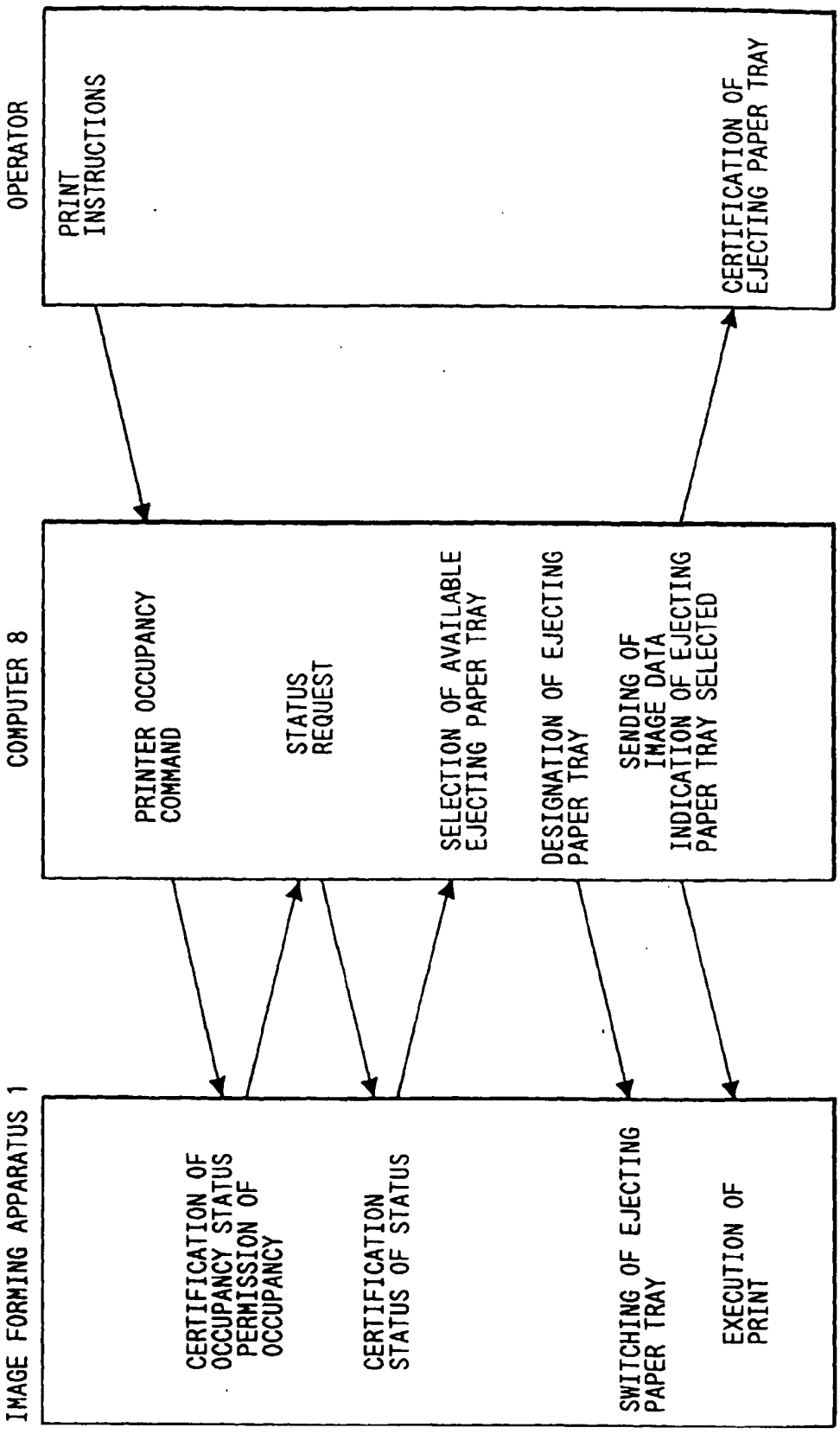
DESIGNATION OF EJECTING PAPER TRAY
COMPUTER 8
PRINTER OCCUPANCY COMMAND
STATUS REQUEST
STATUS INDICATION OF EJECTING PAPER TRAY
DESIGNATION OF EJECTING PAPER TRAY
SENDING OF IMAGE DATA
IMAGE FORMING APPARATUS 1
CERTIFICATION OF OCCUPANCY STATUS PERMISSION OF OCCUPANCY
CERTIFICATION STATUS OF STATUS
SWITCHING OF EJECTING PAPER TRAY
EXECUTION OF PRINT

FIG. 4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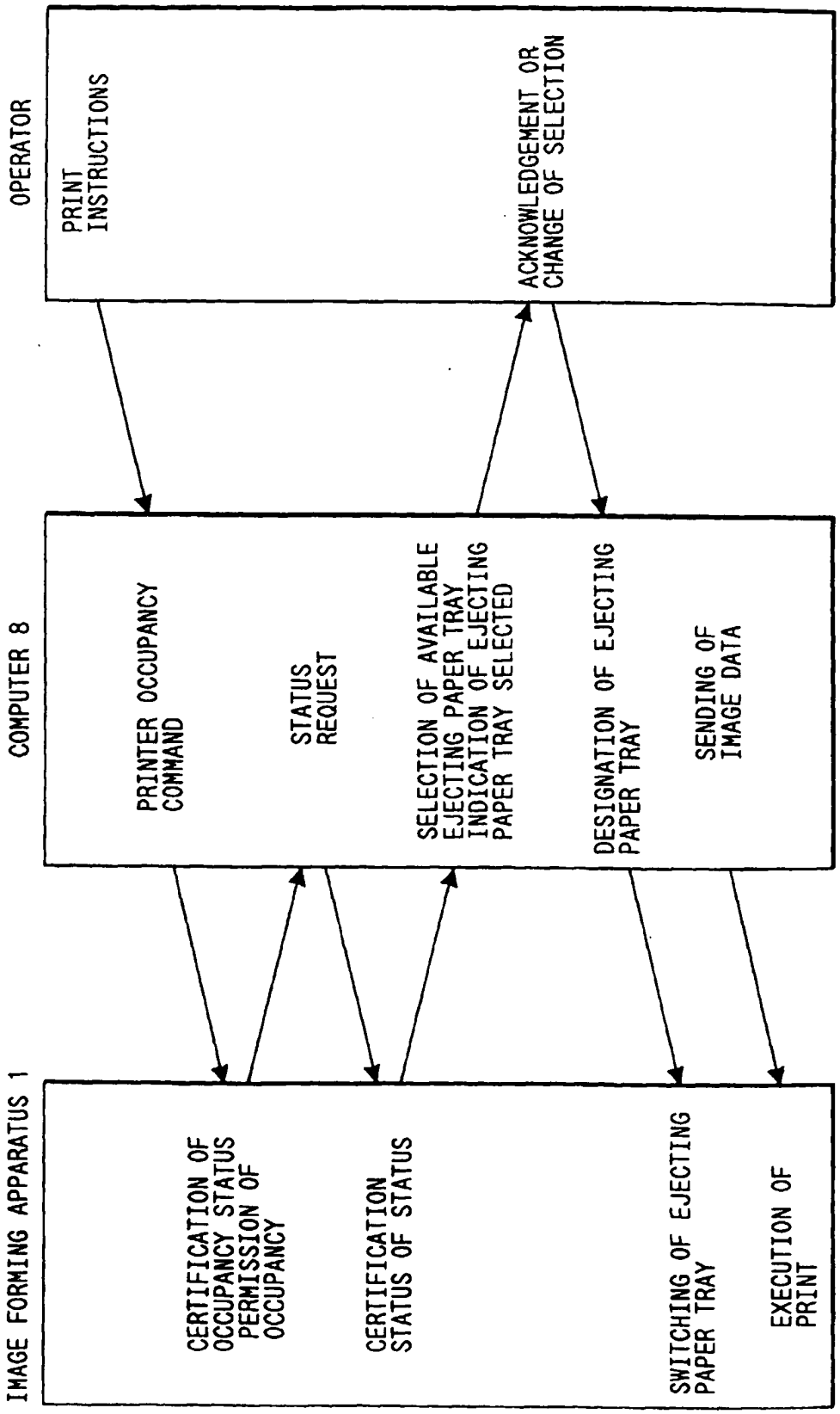
PRINT INSTRUCTIONS
CERTIFICATION OF EJECTING PAPER TRAY
COMPUTER 8
PRINTER OCCUPANCY COMMAND
STATUS REQUEST
SELECTION OF AVAILABLE EJECTING PAPER TRAY
DESIGNATION OF EJECTING PAPER TRAY
SENDING OF IMAGE DATA INDICATION OF EJECTING PAPER TRAY SELECTED
IMAGE FORMING APPARATUS 1
CERTIFICATION OF OCCUPANCY STATUS PERMISSION OF OCCUPANCY
CERTIFICATION STATUS OF STATUS
SWITCHING OF EJECTING PAPER TRAY
EXECUTION OF PRINT

FIG. 5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PRINT INSTRUCTIONS
ACKNOWLEDGEMENT OR CHANGE OF SELECTION
COMPUTER 8
PRINTER OCCUPANCY COMMAND
STATUS REQUEST
SELECTION OF AVAILABLE EJECTING PAPER TRAY INDICATION OF EJECTING PAPER TRAY SELECTED
DESIGNATION OF EJECTING PAPER TRAY
SENDING OF IMAGE DATA
IMAGE FORMING APPARATUS 1
CERTIFICATION OF OCCUPANCY STATUS PERMISSION OF OCCUPANCY
CERTIFICATION STATUS OF STATUS
SWITCHING OF EJECTING PAPER TRAY
EXECUTION OF PRINT

FIG. 6

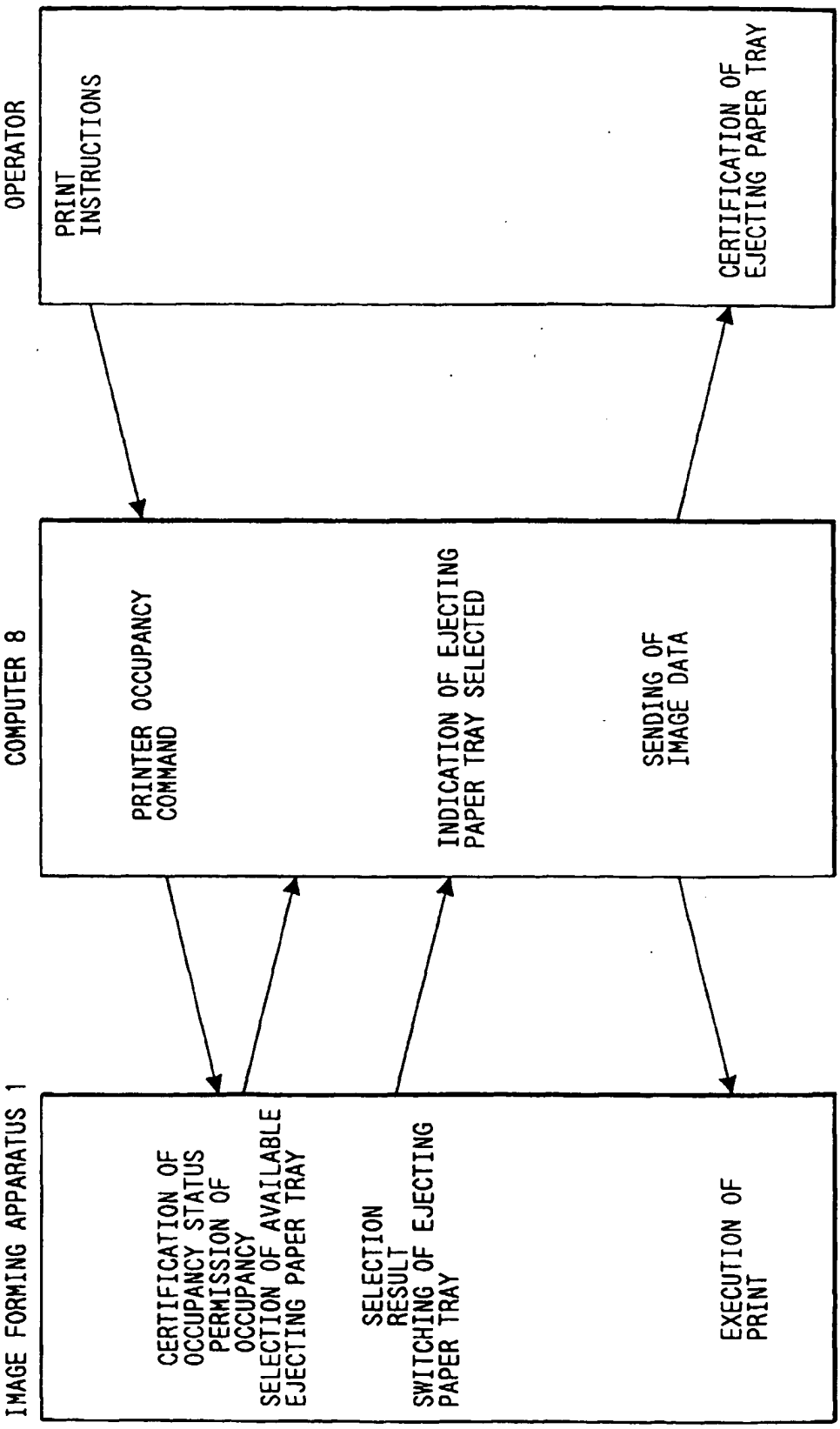
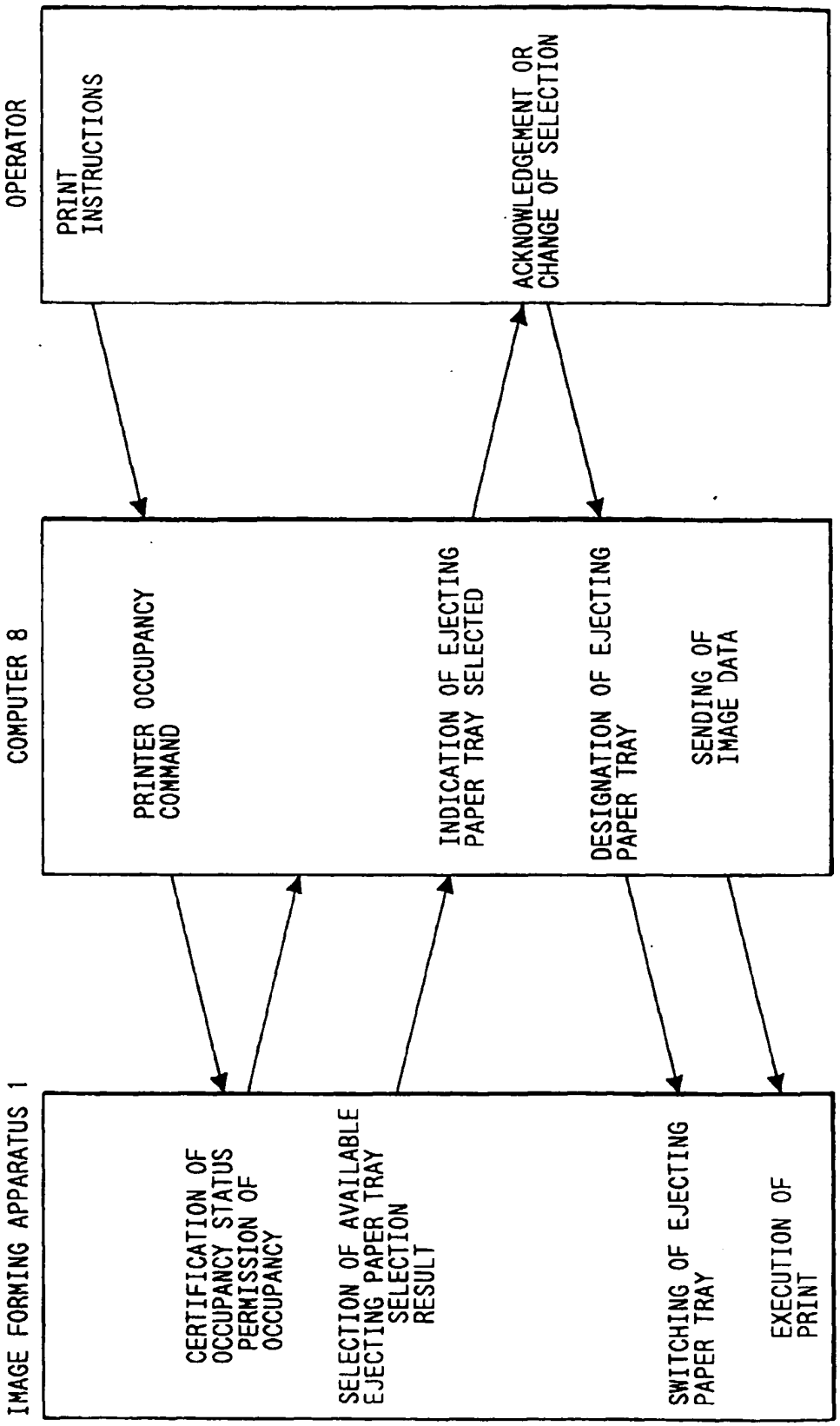

OPERATOR
PRINT INSTRUCTIONS
CERTIFICATION OF EJECTING PAPER TRAY
COMPUTER 8
PRINTER OCCUPANCY COMMAND
INDICATION OF EJECTING PAPER TRAY SELECTED
SENDING OF IMAGE DATA
IMAGE FORMING APPARATUS 1
CERTIFICATION OF OCCUPANCY STATUS
PERMISSION OF OCCUPANCY
SELECTION OF AVAILABLE EJECTING PAPER TRAY
SELECTION RESULT
SWITCHING OF EJECTING PAPER TRAY
EXECUTION OF PRINT

FIG. 7


OPERATOR
PRINT INSTRUCTIONS
ACKNOWLEDGEMENT OR CHANGE OF SELECTION
COMPUTER 8
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INDICATION OF EJECTING PAPER TRAY SELECTED
DESIGNATION OF EJECTING PAPER TRAY
SENDING OF IMAGE DATA
IMAGE FORMING APPARATUS 1
CERTIFICATION OF OCCUPANCY STATUS PERMISSION OF OCCUPANCY
SELECTION OF AVAILABLE EJECTING PAPER TRAY SELECTION RESULT
SWITCHING OF EJECTING PAPER TRAY
EXECUTION OF PRINT